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ABSTRACT

A project was undertaken to develop a catalog of professional and technical competencies needed by a teacher to teach all areas of industrial arts given in the Texas State Board of Education-approved revised curriculum as well as to define and recommend guidelines for implementation of competency testing for industrial arts. Following a research effort involving a computer search and contact with industrial arts faculty of North Texas State University, an initial catalog of competencies was developed. The competencies were classified as either professional industrial arts competencies or technical competencies (visual communications technology, energy/power technology, and production technology). Following validation of the initial catalog by members of the State Jury, a revised catalog was written and validated during a 3-day workshop. Also developed during the workshop were a series of guidelines for implementing competency testing for industrial arts. These recommendations included calls for development of a general education test and an industrial arts examination by and for the state of Texas and for field testing the competencies to reconfirm their validity. (The complete catalog of competencies and list of recommendations are included in the report.) (MN)

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ED218485

FINAL REPORT

Project NO. 22420013

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education of Texas

A Research Project in
Vocational Education

Conducted Under
Public Law 94 - 482, Title II

Funded by the
Research Coordinating Unit
Department of Occupational Education and Technology
Texas Education Agency

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David Devier
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Division of Industrial Arts
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Denton, Texas 76201

June 30, 1982

CE 033 102

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Admission to North Texas State University and any of its sponsored programs is open to qualified individuals regardless of race, color, religion, sex, national origin or educationally-unrelated handicaps.

ACKNOWLEDGEMENTS

The first group providing direction for this research was the Advisory Committee. Members of this group include M.D. Williamson, Texas Council on Industrial Arts Teacher Education; Mike Pickett, Texas Council of Industrial Arts Supervisors; David Hill, Texas Industrial Arts Association; and Neil Ballard, Texas Education Agency.

The State Jury assisted the project by reviewing/editing the original list of competencies developed by the project staff. Members of this group include:

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The major portion of the final product is a direct result of a workshop held May 21-23, 1982 under the sponsorship of the Texas Education Agency. During that workshop, 30 Texas Industrial Arts Educators pooled their experience and expertise to provide professional industrial arts competencies as well as competencies in visual communications technology, energy/power technology and production technology.

Sincere appreciation is expressed to the 30 individuals who interrupted their busy schedules to provide professional leadership to this activity:

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The workshop participants were ably assisted by Neil Ballard, State Director of Industrial Arts, Texas Education Agency. He provided valuable input during several stages, particularly in the development of implementation guidelines.

Secretarial staff consisted of Melanie Gregg and Debbie Jordan. Without their dedication, it would have been impossible to produce the required materials before and during the workshop.

Last, but certainly not least, appreciation is also expressed to: Robert W. Caster, Associate Commissioner for Occupational Education and Technology; Luther W. Thompson, Jr., Director, Occupational Administrative Services; Paul Myers, Chief Consultant, Research Coordinating Unit; Dan Bristow, Director, Research Coordinating Unit; and Patricia F. Lindley, Educational Program Director.

The results of the project will hopefully have considerable impact on the industrial arts profession in Texas. The final report is to be distributed to the Research Coordinating Unit and cross referenced in the ERIC system.

Michael R. Kozak

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UNIT I

Problem Definition

The credibility gap in public education requires a serious re-evaluation of what is being taught in the classroom and the qualifications of those who are teaching. Time is short. Students have many educational needs but relatively limited opportunities to gain the kinds of valid school experiences that equip them for the world of living and working. Schools can change to meet these needs only as the colleges and universities prepare competent teachers. The large expenditures of local, state, and federal funds demand accountability of those who receive and spend those funds. Standards must be developed as guidelines to follow in assessing how well the public is investing its tax monies.

Research is needed to identify teacher competencies and establish guidelines to assist teacher education institutions in preparing the kind of teachers who can achieve the goals of public education in Texas. This seems especially appropriate now as a new industrial arts curriculum is being introduced into the public schools of Texas.

A competency-based industrial arts teacher education program in Texas can offer a measure of accountability on the part of teacher training institutions. It can provide guidelines for competency testing in the teacher certification program, thereby providing certain desirable basic commonalities among

all who are certified to teach industrial arts in the state. Such guidelines would provide a basis for the evaluation and certification of teacher education programs, and would be a step toward the elimination of incompetent teachers in classrooms of the state. A program of competency-based teacher education would provide criteria by which a valid and effective certification program could be developed and evaluated.

Such a program of industrial arts teacher education would then become criterion referenced so that students would be measured against a single standard rather than against their fellow students. Higher standards in industrial arts teacher education might be expected to result with concomitant results in the public school classrooms.

The basis for any meaningful result in the development of a competency-based teacher education program lies in organized research. The identification of professional and technical competencies requires organized research by professionals and there must be a validation process used which assures the profession and children of Texas that relevant subject matter is taught in a meaningful way.

The influx of industry into Texas continues. The demand for professional and technical skills is likely to parallel the growth of industry and the continuing development and advancement of technology. Industrial Arts education shares significantly in the responsibility to provide basic education for the youth of Texas who must be prepared to be a successful part of the labor force in the years ahead. This research is needed to

provide programs of industrial arts education through which children can gain the necessary competencies to ensure their future.

Definition of Terms

"Learning" is a process - not a product - consisting of permanent behavioral changes which leads to the student becoming a free, responsible individual. It occurs in practice of desired behaviors - learning while doing - and develops confidence in the student's ability to succeed.

"Teaching" is the facilitating of learning through motivation by presenting life situation problems within the environment of the classroom with which students must cope. Industrial Arts teaching is the management, through instructional strategies, of an educational environment that is representative of the technological world.

"Competency" is a skill, knowledge or attitude which implies the ability or intelligence to accomplish a task or job. It represents the instructional intent and is stated as a specific goal to be achieved.

Project Description

Objectives

1. To develop a catalog of professional competencies needed by a teacher to teach all areas of industrial arts given in the revised curriculum that was approved by the State Board of Education on March 14, 1981.
2. To develop a catalog of technical competencies needed by a teacher to teach all areas of industrial arts given in

the revised curriculum that was approved by the State Board of Education on March 14, 1981.

3. To define and recommend guidelines for the implementation of competency testing for industrial arts.

Advisory Committee Selection

The Advisory Committee represented a significant guiding force in the project. The Advisory Committee met in Austin at the Texas Education Agency and:

1. Selected a State Jury. This jury included four authorities in each of the three technology areas: visual communications, energy/power, and production. Members of the State Jury included the four members of the Advisory Committee.
2. Selected workshop participants. The thirty workshop participants were from Texas and represented: 1) the colleges/universities that graduate industrial arts instructors, 2) industrial arts supervisors, 3) the Texas Industrial Arts Association, 4) the Texas Council on Industrial Arts Teacher Education, and 5) public school industrial arts instructors. The fifteen public school participants were selected based upon: 1) representation of women and minority groups, 2) regional distribution, 3) rural/urban distribution, and 4) previous involvement in professional activities.

The project's Advisory Committee was formed upon notification of the Texas Education Agency's acceptance of the project proposal. In the spirit of cooperation in the mutual quest of common goals, the Advisory Committee comprised representatives of: 1) Texas Education Agency, 2) Texas Industrial Arts

Association, 3) Texas Council on Industrial Arts Teacher Education, and 4) Texas Council of Industrial Arts Supervisors.

Development of Initial Catalog of Competencies

The following sources were utilized in the preparation of the initial catalog of competencies: 1) computer search at the North Texas State University Library, 2) publishers of industrial arts textbooks, 3) reports of previous studies, and 4) industrial arts faculty of North Texas State University. These competencies were classified as follows:

A. Professional Industrial Arts Competencies

B. Technical Competencies

1. Visual Communications Technology
    a. Drafting
    b. Graphic Arts
    c. Photography
    d. Computer Applications
2. Energy/Power Technology
    a. Power Systems
    b. Electrical Systems
    c. Transportation Systems
    d. Energy Systems
3. Production Technology
    a. Manufacturing
    b. Construction
    c. Woodworking
    d. Metalworking
    e. Plastics
    f. Ceramics

g. Leatherworking

h. Jewelry

Validation By State Jury

The initial catalog of competencies was mailed to the twelve members of the State Jury. Because of the amount of material, each member of the State Jury was asked to validate only those competencies in the technology which is his/her area of expertise. Each member of the Jury was asked to:

1. review/edit the presented material;
2. add any competencies they believed were overlooked;
3. evaluate the competencies as to whether they were appropriate or inappropriate to the individual areas within the technology.

In the process of validation, a competency was considered appropriate if 75% of the members so indicated.

Validation by Workshop Participants

The vehicle proposed for the major activity of this project was a three-day workshop. The catalog of competencies was rewritten based upon the validation procedure of the State Jury. The major objectives of the workshop were:

1. to validate the findings of the State Jury;
2. to determine the minimum acceptable professional industrial arts technical competencies in all areas within each of the three technologies for the graduates of an industrial arts teacher education program in Texas;
3. to define and recommend guidelines for the implementation of competency testing for industrial arts.

Specific Results To Be Produced

At the conclusion of the workshop, the project staff prepared a final report - one hundred copies of which were submitted to the Texas Education Agency. The workshop participants, the members of the State Jury, and the members of the Advisory Committee also received a copy of the final report. This report summarizes the accomplishments of the project, reviews the procedures utilized to accomplish the objectives of the project, lists specific produced results, and evaluates the workshop. The specific results include:

1. a validated catalog of the minimum professional industrial arts competencies needed by a teacher to teach all areas of industrial arts given in the revised curriculum that was approved by the State Board of Education on March 14, 1981;
2. a validated catalog of the minimum technical competencies needed by a teacher to teach all areas of industrial arts given in the revised curriculum that was approved by the State Board of Education on March 14, 1981;
3. recommended guidelines for the implementation of competency testing for industrial arts.

The description of the potential utilization of results provided in this section demonstrates a reasonable probability the results will be used in a substantial number of classrooms or other learning situations within five years after the termination of the activities described in this proposal. It

is envisioned that the personnel who attended this workshop will create a positive affect upon the State's vocational education program by being informed in the areas covered during the workshop. The participants are expected to provide local and state leadership for the continuing development of industrial arts competency testing.

Project Evaluation

A continuous evaluation system was in effect throughout the development of the professional industrial arts competencies and technical competencies. The initial catalog of competencies was evaluated by the State Jury. The competencies validated by the State Jury were validated by the workshop participants. Specific workshop evaluation instruments were completed by all participants.

UNIT II

Project Analysis

State Jury Selection

At the first meeting of the Project Advisory Committee, recommendations were finalized for the composition of the State Jury. Four individuals were selected in each of the three technologies. Alternates were also selected (see Table 1). Of the recommended twelve, only one elected not to serve.

Workshop Participant Identification and Selection

M.D. Williamson, President, Texas Council on Industrial Arts Teacher Education recommended that Kenneth Smith of Prairie View A&M represent TCIATE. Neil Ballard, State Director of Industrial Arts, Texas Education Agency, recommended that Jerry Mycue represent TEA. Mike Pickett, President, Texas Council of Industrial Arts Supervisors recommended that Ralph Shultz represent TCIAS. Of these three, only Jerry Mycue could not attend.

Of the fifteen Texas colleges and universities that graduate industrial arts instructors, eleven elected to send representatives to the workshop. Eight teacher educators did, in fact, participate.

At the first meeting of the Project Advisory Committee, five industrial arts supervisors were recommended. Alternates were also selected (see Table 2). Of the initial five, only one elected not to participate.

Table 1

RECOMMENDATIONS FOR STATE JURY

Visual Communications

David Hill (Classroom Industrial Arts Teacher)
M.D. Williamson (Teacher Educator) President, TCIATE
Billy Windham (Teacher Educator)
Alan Towler (Curriculum Specialist)

Alternates

Dan Dudley (Classroom Industrial Arts Teacher)
Jay Logue (Teacher Educator)

Energy/Power

Mike Pickett (Industrial Arts Supervisor)
Bob Habingreither (Teacher Educator)
David Dietz (Classroom Industrial Arts Teacher)
Hermon Taylor (Classroom Industrial Arts Teacher)

Alternates

Bob Swanson (Teacher Educator)
Stanley Harris (Classroom Industrial Arts Teacher)

Production

Neil Ballard (Texas Education Agency)
Dave Pullius (Industrial Arts Supervisor)
W.A. Mayfield (Teacher Educator)
Larry Hughes (Curriculum Specialist)

Alternates

Jim Petty (Classroom Industrial Arts Teacher)
Floyd Trimble (Industrial Arts Supervisor)

Table 2

RECOMMENDATIONS FOR WORKSHOP PARTICIPANTS

Industrial Arts Supervisors

Selections

Ron Foy, Austin

Floyd Trimble, Dallas

Lloyd Carter, Fort Worth

Steve Foster, San Antonio

Jim Liner, Houston

Alternates

Perry Suter, Austin

Wayne Calk, Ysleta

Ken Alendroth, Dickerson

Ed Kania, Brazosport

Danny Clark, Mesquite

Ralph Shultz, Midland

At the first meeting of the Project Advisory Committee, the members decided that additional input should be obtained in the development of recommendations of public school industrial arts instructors for participation in the workshop. The staff was instructed to request recommendations from Texas Industrial Arts Association board members and regional association presidents. At the second meeting of the Project Advisory Committee, participants were recommended in each of the three technologies. Alternates were also designated (see Table 3). Of the twenty who indicated they would attend the workshop, fifteen participated.

Figure 1 provides a summary of the geographical distribution of the participants. It may be important to note that of the participants, seven percent were women and thirteen percent represented minority groups.

Development of Competencies

A computer search, utilizing the facilities of North Texas State University, yielded 71 articles and documents which were reviewed. Principle publishers of industrial arts textbooks contributed approximately 200 books, manuals and guides, (See Table 4 for contributing publishers). Reports of previous studies were received from Wisconsin, Virginia and Pennsylvania.

Approximately 300 professional industrial arts competencies were initially identified. This was followed by the development of a similar number of technical competencies. These competencies were catagorized and prepared in an outline form for distribution to the State Jury.

Table 3

RECOMMENDATIONS FOR WORKSHOP PARTICIPANTS

Public School Industrial Arts Instructors

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*Alternates

FIGURE I

GEOGRAPHICAL DISTRIBUTION OF PARTICIPANTS

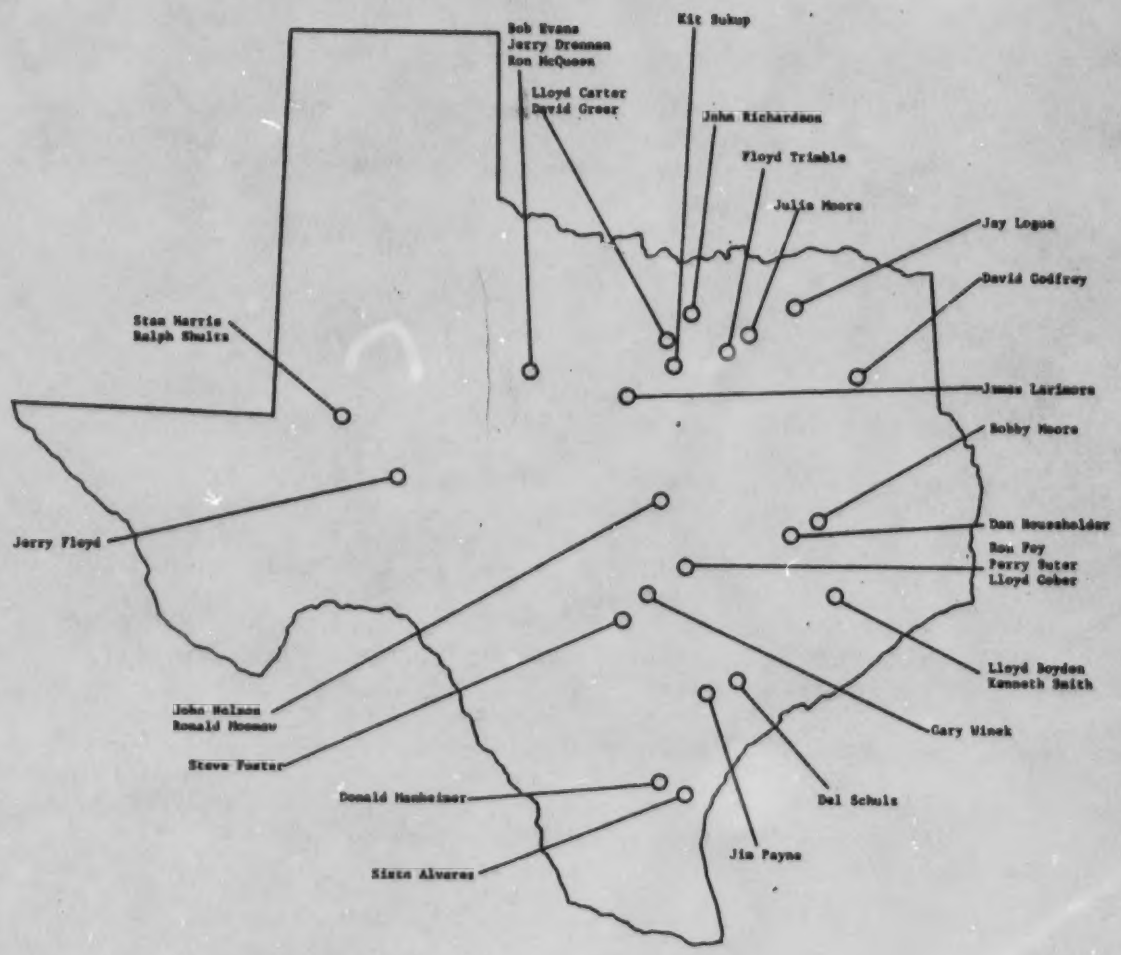

Table 4

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David Danser-Delmar Publishers
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Donna Suhre
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Mary Kamplain
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McKnight Publishing Company
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(309) 663-1341

Tommy Proctor
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Alsip, Illinois 60658

Competency statements are related to statements of goals and objectives. They are not broad statements of expected learning outcomes like goal statements, nor are they specific statements of expected learning outcomes like objective statements. Competency statements are "mid-range" statements that are placed on the continuum between goal and objective statements.

The list prepared for this project included competency statements that range from the very broad to the quite narrow. However, the intent of the compilers was to avoid both the extremely broad (goal) and the extremely narrow (objective). It is understood that this list of competency statements are not, by themselves, operational, these statements serve only as a description of the competencies which a beginning industrial arts instructor must exhibit.

Each member of the State Jury was asked to: 1) review/edit the presented material; 2) add any competencies they believed were overlooked; and 3) evaluate the competencies as to whether they were appropriate to the individual topic areas. Additional input was also requested from the professional industrial arts faculty of North Texas State University. During this validation process, all but three of the original competencies were considered appropriate by 75% of the members of the State Jury. Approximately 30% of the competencies were reworded, based on State Jury recommendations, and several additional competencies were added. All changes on the original list were so indicated on the material presented to the workshop participants.

The vehicle for the major activity of this project was a three-day workshop. The workshop participants were charged to: 1) validate the findings of the State Jury; 2) determine the minimum acceptable professional competencies; and 3) determine the minimum acceptable technical competencies in all topic areas within each of the three approved technologies (visual communications, energy/power, production) for the graduates of an industrial arts teacher education program in Texas. These graduates have completed their course work, have student taught, but have not begun their formal teaching career. Because of this time frame, it has been necessary to edit some of the competencies that were approved by the workshop participants. Tables 5 through 21 list the minimum acceptable competencies as determined by the workshop participants. Table 5 - Professional Industrial Arts Competencies - contains competencies common to the topic areas within the three technologies. Tables 6 through 21 - Technical Competencies - contain only those competencies peculiar to each designated topic area.

Development of Implementation Guidelines

Another major objective of the workshop was to define and recommend guidelines for the implementation of competency testing for industrial arts (See Table 22). It is envisioned that these recommendations will enhance the probability that the minimum competencies validated by the workshop participants will be utilized within five years after the termination of this proposal to upgrade the teacher education programs of Texas, and to standardize teacher qualifications.

Table 5

PROFESSIONAL INDUSTRIAL ARTS COMPETENCIES

I. RESPONSIBILITIES OF TEACHING

A. Content Knowledge

1. Industry and Technology

a. Know the basic concepts of free enterprise.

b. Know current working definitions and understanding of industry and technology in terms of organization, materials, processes and products.

c. Have the basic concepts of a student operated business in the classroom (i.e. manufactruing, construction or service).

d. Demonstrate a knowledge and understanding of how mankind uses technology to affect change in the environment.

e. Implementation

1) Select current relevant technology to clarify concepts.

2) Encourage students to be independent and responsible thinkers by considering conflicting evidence, ideas and values regarding technology.

2. Industrial Arts

a. Information

1) Have a knowledge of historical, contemporary,

and exemplary industrial arts programs.

2) Know the rationale of existing curricula in industrial arts and utilize appropriate components and strategies to meet specific pupil, curriculum and/or program needs.

3) Know the organization of the state approved industrial arts curriculum.

4) Understand the history of industry and technology, as well as the purposes and principles of Industrial Arts.

b. Implementation

1) Assist students in anticipating the nature of the future.

2) Provide avocational experiences by relating subject content of industrial arts to everyday personal family experiences, and avocational responsibilities.

3) Provide for technological literacy with experiences that bring the world of technology to the classroom.

B. Teaching Tactics and Strategies

1. Organize instructional program.

a. Write student performance objectives.

b. Identify proper sequence for student performance.

c. Know the principles of team teaching and differentiated staffing as it applies to industrial arts.

d. Prepare and present effective demonstrations.

e. Demonstrate the ability to plan and conduct field trips.

f. Know the importance of strategies for establishing contact with community resources and utilize them in the instructional program.

g. Plan strategies and activities for implementing the curriculum.

2. Provide for a balance of learning and teaching domains.

a. Assist students to recognize aesthetic qualities in industrial arts.

b. Provide learning alternatives through a variety of avenues such as group projects, research and experimentation (problem solving), and individual projects.

c. Identify differences in the ways individuals learn and adapt strategies.

3. Know and implement strategies to provide consumer-oriented experiences.

4. Accept the responsibility to work positively with individuals from various cultural, social, economic, and ethnic background in achieving industrial arts objectives.

C. Safety

1. Laboratory Preparation

a. Be aware of federal, state and local regulations which apply to industrial arts facilities.
b. Demonstrate safe and functional storage of tools, materials, and supplies.
c. Be able to maintain tools and equipment for safe operation.
d. Identify state guidelines that pertain to industrial arts facilities and maximum class loads.

2. Instructor Awareness
   a. Understand the state and local policies and procedures on the industrial arts teacher's role, especially concerning health, safety, and first aid in accident situations.
   b. Know the principles of how to handle situations requiring first aid or medical treatment within the limits of liability laws and local policies.
   c. Be able to identify symptoms of physical illness or disability which hinder safe operation of lab equipment.
   d. Be aware of the responsibility for safe personal work habits and the development of a safe working environment.
   e. Identify unsafe acts and conditions in industrial arts labs.
3. Instruction

a. Design and maintain an effective safety program which applies accepted safety standards and includes safety instruction as an integral part of all instruction and laboratory activities.

b. Assemble guidelines for potential emergencies that may be anticipated.

D. Evaluation

1. Self Evaluation

a. Identify a strategy for evaluating instruction which utilizes verbal and non-verbal feedback.

b. Show sensitivity to the attitude of pupils toward material presented.

c. Analyze student feedback regarding methods.

2. Student/Student Self Evaluation

a. Construct criteria for student performance in the program.

b. Define student performance in relation to course objectives.

c. Assemble evaluative techniques for assessing attitudes, knowledges, and skills.

d. Construct a comprehensive evaluation.

e. Provide standards of evaluation which permit students to evaluate their own progress.

E. Discipline

1. Preparation

a. Display a consistent knowledge/philosophy regarding the handling of discipline problems.

b. Provide standards of student behavior in classroom and laboratory.

2. Implementation

a. Apply concepts and principles of constructively controlling student behavior in class/lab.

b. Display consistency in dealing with problems of management and discipline.

F. Special Needs Students (Including the Gifted)

1. Identify differences and be able to plan for special needs students.

2. Know and be able to use instructional methods used to teach students with special needs.

3. Be familiar with materials and equipment designed for special needs students.

G. Laboratory Management

1. Supplies/Materials

a. Select and specify equipment, materials, and supplies appropriate for program objectives.

b. Construct budgets and purchase requests.

c. Assemble a record and filing system, including an inventory of tools, supplies, and equipment.

d. Be able to predict the future need of supplies, equipment etc.

e. Select industrial arts reference materials and periodicals for the industrial arts laboratory and school library.

f. Develop industrial arts instructional materials.

g. Evaluate and select state adopted textbooks from the multiple textbook adoption system.

h. Design a controlled supply allocation system.

i. Describe the state textbook adoption process.

2. Maintenance

a. Make minor repairs and adjustments on tools and equipment.

b. Manage and maintain equipment in a laboratory.

3. Organization

a. Identify routing procedures which make for greater efficiency in the classroom/laboratory planning and operating standards.

b. Develop an effective pupil personnel system for classroom/laboratory organization.

4. Miscellaneous

a. Develop policies governing the use of industrial arts physical facilities and equipment by school personnel and outside groups.

b. Use bulletin boards and/or displays.

c. Plan and be able to maintain facilities consistent with TEA guidelines.

II. RELATIONSHIP TO VOCATIONAL EDUCATION

A. General Information

1. Explain the philosophies of industrial arts and vocational education.

2. Describe how to interface industrial arts with vocational education.

B. Skill Development

1. Maintain high quality standards
2. Display an appreciation for craftsmanship in the work of others.

C. Career Information

1. Identify careers related to the instructional areas in industrial arts and know how to work with counselors to provide career guidance and other appropriate services.
2. Develop and implement learning experiences that will assist students in understanding the career opportunities available in industry and be able to incorporate this occupational information into the instructional program.
3. Be able to act as a resource person for students in making meaningful career choices, educational choices and identifying avocational interests.

D. Career Exploration

1. Create a systematic instructional program of exploring occupations and assisting students in understanding the relationships between self and future work values and roles.
2. Be able to assist the student in assessing career objectives and opportunities, in developing career goals, and in rational career decision-making process.
3. Design practical job-oriented learning experiences

which provide instruction directly related to the saleable skills required as needed.

III. RELATIONSHIP TO GENERAL EDUCATION

A. Describe the interdisciplinary nature of industrial arts.

B. Construct lesson plans with major concepts from other disciplines as they become relevant.

C. Integrate concepts from general education subjects in the systematic instructional program.

IV. PROFESSIONALISM

A. Professional Development

1. Accept the responsibility to participate in industrial arts seminars/workshops, visit industries, and consult with professional and technical personnel.
2. Plan and be prepared to carry out a plan of continous professional growth.
3. Assume the responsibility that professional development requires a commitment of time, expertise, and financial support.
4. Develop technical writing abilities.
5. Be able to contribute to effective institutional operation.

B. Philosophical Development

1. Create a personal philosophy consistent with the principles of industrial arts.
2. Evaluate and revise a philosophy of industrial arts education and life.

C. Ethics

1. Exhibit ethical standards expected of a professional educator and act as a model for students.
2. Adhere to responsibilities for personal performance and professional growth.

D. Professional Organizations

1. Identify the teaching and professional resources available in professional associations and publications.
2. Demonstrate knowledge of the professional industrial arts organizations at the national, state, regional and local level.

E. Student Relations

1. Create student rapport while retaining professional stature.
2. Reflect a student oriented attitude as you work with students and peers.

F. Student Organizations

1. Know the value of industrial arts student organizations and demonstrate the ability to organize an industrial arts student club and use club-related activities to promote learning and improve the the educational environment.
2. Demonstrate understanding of industrial arts competitive events at the regional and state level by assisting in conducting at least one of these activities.

3. Demonstrate competence in parliamentary procedures.

V. RELATIONSHIP TO SOCIETY/CULTURE

A. Know the effects of accelerating technological advances on society.

B. Know the principles of the impact of industry and technology on man and his culture.

C. Write industrial arts educational objectives to include values important to the general culture.

VI. ADVISORY COMMITTEES

A. Understand the role and scope of the advisory committee when used in the community to strengthen the industrial arts program.

B. Identify the steps in organizing, developing and operating an industrial arts advisory committee consisting of local individuals from business and industry.

Table 6

VISUAL COMMUNICATIONS TECHNOLOGY

TOPIC AREA: DRAFTING

I. KNOWLEDGE

A. Know specific drawing instruments and equipment.

B. Know the basic principles of drafting reproduction.

C. Be able to integrate concepts of drafting into a system of communication as it relates to all of the technology areas of the approved curriculum.

II. SKILLS

A. Know and correctly apply:

1. The Alphabet of lines
2. Lettering Techniques
3. Dimensioning Techniques
   a. English
   b. Metric

B. Know the basic facts and concepts of, show an appreciation for, and develop basic skills needed in:

1. Pictoral Drawing
   a. Isometric
   b. Oblique
   c. Perspective
2. Freehand Sketching
3. Geometric Construction
4. Sections
5. Auxiliary Views

C. Know basic facts and concepts of, show an appreciation

for, and develop basic skills needed to create drawings of machine tools and parts.

D. Know basic facts and concepts of, show an appreciation for, and develop basic skills needed to create:

1. Residential and Light Commercial Floor Plans
2. Foundation Plans
3. Elevations
4. Details
5. Plot Plans
6. Specifications
7. Schedules

Table 7

VISUAL COMMUNICATIONS TECHNOLOGY

TOPIC AREA: GRAPHIC ARTS

I. KNOWLEDGE

A. Know the basic materials, tools, and equipment used in printing.

B. Know the basic materials, tools, and equipment used in related industries.

II. SKILLS

A. Know basic facts and concepts of, show an appreciation for, and develop basic skills necessary for planning, organizing and controlling people and materials.

B. Know basic facts and concepts of, show an appreciation for, and develop basic skills necessary for:

1. Design and Layout
2. Composition
   a. Hot and Cold
   b. Dry Transfer
   c. Clip Art
3. Photo Conversion
   a. Negatives
   b. Positive Mechanical Transfers
   c. Half-tone Positives
4. Image Carrier Creation
   a. Plate Making
   b. Stencil Cutting
   c. Ditto

5. Image Transfer
    a. Mimeo
    b. Ditto
    c. Electrostatic
    d. Letterpress
    e. Offset Printing
    f. Rubberstamping
    g. Block Printing
    h. Silk Screen Process
6. Finishing and Binding
    a. Die Cutting
    b. Embossing
    c. Perforating
    d. Trimming
    e. Stitching

Table 8

VISUAL COMMUNICATIONS TECHNOLOGY

TOPIC AREA: PHOTOGRAPHY

I. KNOWLEDGE

A. Know and appreciate the theory and principles of photography.

B. Know and appreciate the history of photography.

II. SKILLS

A. Understand, value, and become skillful with the various types of photographic equipment:

1. Cameras
2. Film
3. Accessories

B. Apply the theories, develop an appreciation for, and become skillful in the basic black and white and/or color film development techniques.

C. Understand the principles of, become sensitive to, and develop the skills related to black and white and/or color photographic printing and finishing of photographics.

D. Know, value, and use photo composition techniques.

Table 9

VISUAL COMMUNICATIONS TECHNOLOGY

TOPIC AREA: COMPUTER APPLICATIONS

I. KNOWLEDGE

A. Understand and value the impact of the computer to industry and society in general.

B. Know and appreciate the history and possible future of the computer.

C. Show an understanding of, and respect for the legal considerations related to freedom of expression, privacy, information, and censorship.

II. SKILLS

A. Know the basic principles of, develop a value system related to, and develop basic skills in computer:

1. Terminology
2. Languages
3. Equipment
4. Software
5. Programming

B. Demonstrate awareness and familiarization of several common computer applications for:

1. Computer Assisted Design
2. Graphic and Image Generation
3. Energy, Power, and System Control
4. Data Base Management

5. Educational-Tutorial Applications
6. Inventory Control and Budget
7. Personal Applications
8. Games

Table 10

ENERGY/POWER TECHNOLOGY

TOPIC AREA: POWER SYSTEMS

I. KNOWLEDGE

A. Basic Concepts

1. Trace development of major power systems:
   a. Wind Power
   b. Water Power
   c. Steam Power
   d. Atomic Power
2. Describe significant developments pertaining to the automobile.
3. Explain the present state of power production.
4. Identify an operational definition and concept of power systems.
5. Define the basic terms commonly used in power systems.
6. Describe the types of power systems used in our society.
7. Explain the six simple machines and their applications:
   a. Lever
   b. Wheel/Axle
   c. Pulley
   d. Inclined Plane
   e. Screw
   f. Wedge

B. Impact On Society

1. Explain how power technology affects society.
2. Describe the development and utilization of the automobile.
3. Describe the combustion engine's importance in transportation and industry.

C. Power Systems of the Future

1. Describe the basic principles and applications of nuclear power.
2. Describe other sources of power and their applications:
   a. Fossil Fuels
   b. Organic
   c. Solar

II. SKILLS

A. Internal Combustion Engines

1. Define the principles of operation and list the various components of two cycle/four cycle engines.
2. Describe the basic principles of the rotary combustion engine.
3. Describe the basic principles of operation for diesel engines.
4. Describe the basic principles of operation for jet engines.
5. Explain lubrication systems, their function and importance in power technology.
6. Define internal combustion engine performance

utilizing a variety of test instruments.

7. Identify the basic principles of combustion power sources.

B. External Combustion Engines

1. Define the basic principles of the external combustion engine.
2. Define the basic principles of piston and turbine use of steam power.
3. Relate the similarities and differences between the external and internal combustion convertors.

C. Motors

1. Define a motor and give examples.
2. Describe basic principles of motor selection.
3. Describe principles of motor operation.

D. Power Transmission/Control

1. Mechanical Systems
   a. Know the basic concepts of mechanical transmission devices:
      1) Gear Ratio/Direction Shafts
      2) Belts
      3) Chain Drives
      4) Variable Speed Drives
      5) Clutches
      6) Brakes
      7) Pulleys
      8) Other Mechanical Linkages
2. Fluidics

a. Explain the basic principles of pneumatics as a source of power.

b. Describe the applications of pneumatics in a technological society.

c. Explain the basic principles of hydraulics as a source of power.

d. Describe the applications of hydraulics in a technological society.

e. Construct fluid power systems utilizing typical components.

f. Manipulate common test instruments to analyze fluid power circuits.

3. Electrical Power

a. Explain the basic principles and theory of electricity.

b. Explain sources of electrical input.

c. Identify the laws and principles of circuits and current.

d. Explain the processing of electrical power through the devises of control and transmission.

E. Perform skillfully in the use of tools and equipment used in the power systems technology laboratory.

F. Know about available experiments, kits, activities, and projects in energy/power technology.

Table 11

ENERGY/POWER TECHNOLOGY

TOPIC AREA: ELECTRICAL SYSTEMS

I. KNOWLEDGE

A. Basic Concepts

1. Understand the principles of static electricity.
2. Understand the principles of dynamic electricity.
3. Identify the sources of electricity.
4. Define the basic electrical units (volt, amp, etc.)
5. Explain the basic electron theory.
6. Explain the basic concepts of the construction and characteristics of electronic components.
7. Know the principles of magnetism.
8. Know the basic concepts of electromagnetism.
9. Understand the basic principles involved in transmission and reception.
10. Define basic storage systems: voltaic cell, primary cell, secondary cell, and battery.
11. Understand problems of high voltage distribution.
12. Understand the principles of DC current.
13. Understand the principles of AC current.
14. Describe the basic principles of:
    a. Radio
    b. Television
    c. Microwave Communication
15. Know the basic concepts of solid state circuitry.

16. Explain the principles and components of power supplies.
17. Know the process of amplification.
18. Explain the construction and uses of integrated circuits.
19. Relate the impact of electricity on our society.

B. Theories/Laws

1. Define resistance.
2. Define inductance.
3. Define capacitance.
4. Define generator.
5. Explain Ohm's Law.
6. Explain Kirchoff's Law.
7. Explain Watt's Law.
8. Explain Lenz's Law.

II. SKILLS

A. Operate:

1. Ammeter
2. Voltmeter
3. Ohmmeter
4. Multimeter

B. Construct the basic types of circuits:

1. Series
2. Parallel
3. Series-Parallel

C. Recognize the wiring symbols for electrical installation.

D. Construct and read basic electrical schematic diagrams.

E. Describe the electrical supplies/materials for:

1. Residential Wiring
2. Commercial Wiring
3. Industrial Machine Wiring

F. Describe the electrical codes for:
   1. Residential Wiring
   2. Commercial Wiring
   3. Industrial Machine Wiring

G. Construct products utilizing electrical components.

H. Explain energy saving devices:
   1. Lighting
   2. Appliances
   3. Air Conditioning

I. Install electric motors and controls.

Table 12

ENERGY/POWER TECHNOLOGY

TOPIC AREA: TRANSPORTATION SYSTEMS

I. KNOWLEDGE

A. Basic Concepts

1. Know basic facts of the history of transportation.
2. Explain the advantages and limitations of the modes of transportation:
   a. Waterways
   b. Landways
   c. Airways
   d. Space
3. Explain the mechanical, pneumatic, and hydraulic transmission of power.
4. Describe the functions of transportation systems in the movement of goods and people.
5. Describe the components of the transportation system.
6. Summarize rules and regulations which control transportation systems.
7. Explain the connection between transportation and communications.
8. List the advantages of various forms of mass transit.

B. Impact on Society

1. Explain the needs of society for transportation.
2. Describe the significant influences of transportation on our society.

3. Explain the pollution problems posed by the use of various transportation systems.

C. Transportation in the Future

1. Predict the physical and social problems and possible solutions connected with mass-transit systems.
2. Consider future changes in types of transportation.

II. SKILLS

A. Construct mechanical and electrical control devices.

B. Design and construct models of transportation systems.

C. Read and interpret:

1. maps
2. charts
3. schedules

D. Explain the support systems which serve the transportation enterprise.

Table 13

ENERGY/POWER TECHNOLOGY

TOPIC AREA: ENERGY SYSTEMS

I. KNOWLEDGE

A. Basic Concepts

1. Know the basic trends of energy use and growth patterns.
2. Select an operational definition/concept of energy in relation to efficiency.
3. Define common terms related to the study and use of energy.
4. Define technical terms and basic vocabulary of the study of energy.
5. Explain alternative sources of energy.
6. Describe major physical and social problems and possible solutions concerning alternate energy sources.
7. Understand the facts and principles of a nuclear reactor.
8. Know the basic concepts of storage, transmission and control of various forms of energy.
9. Know the major experimental energy sources.

B. Energy Resources

1. Know the basic concepts of coal energy resource in terms of:

a. Types

b. Characteristics

c. Environmental Considerations

d. Economic Impact

e. Social Impact

2. Know the basic concepts of petroleum and natural gas energy resources in terms of:

a. Availability

b. Characteristics

c. Environmental Implications

d. Social Implications

e. Economic Implications

3. Know specific facts concerning the status, availability, significance, economic, and environment advantages and disadvantages of various solar energy systems:

a. Indirect

b. Direct

c. Active

d. Passive

C. Laws

1. Describe the First Law of Thermodynamics (Law of Energy Conservation) and how it relates to the study of energy technology.

2. Describe the Second Law of Thermodynamics (Downgrading of Energy Usefulness) and how it relates to the study of energy technology.

II. SKILLS

A. Explain the basic types of energy conversion.

B. Identify the various forms that energy can be converted from and to:

   1. Heat
   2. Light
   3. Electricity
   4. Mechanical
   5. Chemical
   6. Nuclear

C. Recognize and respond to the need for energy conservation (electrical, water, fossil fuels) in residential, commercial, industrial and transportation application.

D. Encourage the wise utilization of energy as a consumer.

E. Design experiments and activities which demonstrate the efficient use of energy in the home.

Table 14

PRODUCTION TECHNOLOGY

TOPIC AREA: MANUFACTURING

I. KNOWLEDGE

A. Define manufacturing.

B. Know the basic terminology related to manufacturing.

C. Understand the relationships of the elements of manufacturing.

D. Demonstrate a knowledge of the historical development of manufacturing.

E. Understand the importance of:

1. Responsible Public Relations
2. Advertizing
3. Packaging of Products
4. Services
5. Responsible Consumerism

F. Know the factors involved in designing functional facilities.

G. Understand the processing of raw materials into standard stock and standard stock into finished products.

H. Understand the sources, nature, application, and the relationships of materials used in manufacturing.

I. Understand that production and services combine both technical and human relations skills.

J. Understand management concepts used in planning, organizing, and directing personnel.

K. Understand the relationships between management and labor in production practices.

L. Understand the relationship of manufacturing to society.

M. Understand the principles of supply and demand.

N. Understand the meaning of cost/benefit decision making not only from the manufacturing perspective, but also from the social, ecological community and personal perspective.

O. Understand the advantages and disadvantages of specialization to increase efficiency of production and services.

P. Understand the efficient use and reuse of materials.

Q. Understand the relationship between technological knowledge and processes in manufacturing industries and their impact on social life.

R. Know the financing of a business as well as the liquidation of assets.

II. SKILLS

A. Know the process for researching, designing, engineering, production, marketing, and servicing products.

B. Identify and select appropriate materials for specific applications:

1. Forest Products
2. Metallics
3. Plastics
4. Ceramics
5. Leather
6. Textiles

C. Display an appreciation for and understanding of the tools and materials utilized in manufacturing processes.

Table 15

PRODUCTION TECHNOLOGY

TOPIC AREA: CONSTRUCTION

I. KNOWLEDGE

A. Define construction.

B. Know the common terms used in construction.

C. Understand the elements in construction:

1. Human

2. Materials

3. Tools

4. Energy

5. Processes

D. Understand the relationships between management and labor in construction practices.

E. Identify other than traditional construction possibilities.

F. Explain how construction meets human needs.

G. Understand the meaning of cost/benefit decision making from the social, ecological, community and personal perspective.

H. Explain the financing of homes under current mortgage conditions.

I. Know FHA and local building requirements.

J. Understand the principles of supply and demand.

K. Understand the efficient use and reuse of materials.

II. SKILLS

A. Understand the relationships between management and labor in construction practices.

B. Identify and compare the different types of structures and their effects upon man's environment.

C. Identify materials used in construction of common structures.

D. Develop a concept of alternate energy facilities for utilization in structures.

E. Plan and organize a construction project.

F. Know the basic principles of building foundations.

G. Know the basic principles of framing wall and roof structures.

H. Know basic principles of utilities in construction.

I. Know basic principles for finishing the construction projects.

J. Understand basic repair, maintenance, and reconditioning of structures.

K. Know how to retrofit existing structures for alternate energy resources.

Table 16

PRODUCTION TECHNOLOGY

TOPIC AREA: WOODWORKING

I. KNOWLEDGE

A. Know the basic principles and techniques involved in constructing products in various areas of woodworking:

1. Furniture Making
2. Cabinetmaking
3. Refinishing
4. Patternmaking
5. Laminating
6. Upholstering

B. Know and explain the role that woodworking plays in American industry.

C. Know and explain the steps in creative designing and planning a woodworking product.

D. Know the natural and synthetic materials used in woodworking and their applications.

E. Be aware of new developments in products obtained from trees - chemicals especially.

F. Develop the concept of efficient use of materials in woodworking.

G. Know the current processes in the wood (lumber) production industry:

1. Forestry

2. Sawmilling (computerized needs).
3. Uses of what was formerly waste products (sawdust, bark, etc.)

II. SKILLS

A. Develop and demonstrate a proficiency in the operation of woodworking machines, portable power tools and hand tools.

B. Identify and demonstrate the basic techniques involved in constructing common types of woodworking products.

C. Identify and emphasize quality in the construction of woodworking products.

D. Know the basic techniques utilized in reconditioning woodworking products.

E. Know and demonstrate the various fastening techniques used in woodworking.

F. Know and demonstrate basic techniques used in surface preparation to finish materials used in the woodworking industry.

G. Demonstrate the common finishing principles and techniques used in woodworking.

Table 17

PRODUCTION TECHNOLOGY

TOPIC AREA: METALWORKING

I. KNOWLEDGE

A. Know the common metals, their properties, and how they are refined.

B. Be familiar with the newly developing welding processes.

C. Understand the principles and techniques of hand forging and a familiarity with machine forging.

D. Understand the principles and techniques of heat treatment and metallurgy.

II. SKILLS

A. Use current and evolving methods to develop orderly and effective activities in fabricating metal products.

B. Perform the common finishing methods in metalworking.

C. Perform with measurement and layout tools.

D. Perform with the basic machine tools to shape and form metals.

E. Perform bench work processes with the appropriate tools and machines.

F. Perform sheetmetal processes with the appropriate tools and machines.

G. Perform wrought metal processes with the appropriate tools and machines.

H. Perform with traditional welding processes.

I. Understand and demonstrate principles and techniques of foundry work.

Table 18

PRODUCTION TECHNOLOGY

TOPIC AREA: PLASTICS

I. KNOWLEDGE

A. Know the common terminology used in plastics.

B. Understand the importance of plastics

C. Know the classification and properties of plastics.

II. SKILLS

A. Understand the basic principles of processes of how plastic products are fabricated including various hand tools and machines.

B. Demonstrate a knowledge of fabricating plastics products.

Table 19

PRODUCTION TECHNOLOGY

TOPIC AREA: CERAMICS

I. KNOWLEDGE

A. Be familiar with the materials commonly used in ceramics.

B. Understand the basic tools, principles, and techniques used to fabricate ceramic products.

II. SKILLS

A. Demonstrate the proper use of tools and equipment common to ceramics.

B. Perform the common finishing methods in ceramics.

Table 20

PRODUCTION TECHNOLOGY

TOPIC AREA: LEATHERWORKING

I. KNOWLEDGE

A. Know the common terminology used in leatherworking.

B. Understand the basic tools, principles, and techniques of the processes used in leatherworking.

II. SKILLS

A. Demonstrate an ability to fabricate leather products.

B. Demonstrate an ability to finish leather products.

Table 21

PRODUCTION TECHNOLOGY

TOPIC AREA: JEWELRY

I. KNOWLEDGE

A. Know the common terminology used in jewelry.

B. Know the metals and stones commonly used in jewelry.

II. SKILLS

A. Understand the basic tools and unique principles of design in fabricating in jewelry making.

B. Understand the basic tools and unique principles of design in finishing in jewelry making.

Table 22

RECOMMENDATIONS FOR IMPLEMENTATION

By Industrial Arts Instructors

1. Texas should develop its own general education test.
2. The Industrial Arts Competency Examination should be developed by a private contractor using the competencies developed under this project, and that final approval of the test should be given by a committee composed of seven individuals including two industrial arts supervisors, two teacher educators, one Texas Education Association representative, one public school industrial arts instructor, and one Texas Industrial Arts Association representative.
3. The general education test and the industrial arts examination are to be established, approved, and validated prior to May 1, 1986.

By Industrial Arts Supervisors

1. These competencies should be used to make up an examination that will become a standardized test for the State of Texas. It is not recommended that the National Teacher Examination (NTE) or any other national test be given.
2. The industrial arts teacher education colleges and universities should certify or sign-off those competencies that the student meets or acquires that cannot be tested on a paper-and-pencil test.
3. An advisory committee should determine what competencies

are to be on a written test and what competencies are to be on a standardized sign-off certification program by the universities.

4. A competency course should be offered by universities for students that transfer in from other states and/or other teaching fields or disciplines.

By Industrial Arts Teacher Educators

1. The list of competencies should be reviewed by a panel of professionals representing TCIATE and other professional organizations. Field testing should be conducted to obtain empirical evidence on the validity of the competency list.
2. Review existing industrial arts teacher education programs to estimate the revisions which would be needed to build all minimum competencies.
3. Identify which of the competencies within each of the technologies are to be required for each of the proposed certificate programs.
4. Establish check-off points during the industrial arts teacher education program when mastery of detailed technical competencies could be established.
5. Determine whether the proposed competencies will prepare teachers who meet the expectations of public school administrators.
6. Consider how to develop the competencies of in-service teachers.
7. Continue and support close relationships between professional associations and the Texas Education Agency.

8. If a competency test is to be developed, consideration should be given to the use of an outside contractor to develop an instrument. Content should be selected based upon the recommendation of a representative group from the industrial arts profession.
9. Texas should capitalize upon the experiences of other states in competency testing of prospective industrial arts teachers.
10. Establish clear delineation between the competency requirements for provisional and professional certificates.
11. Provide for periodic revisions of the competency test.

CONCLUSIONS

Perhaps the best concluding remarks would be to refer the reader to "Acknowledgements." There a group of dedicated professionals is listed who provided thoughtful insights to the project. As project director, this author is most grateful for the dedication of all involved - participants, the Advisory Committee and the State Jury alike. While it would be presumptuous to state that this project will largely contribute to the vocational community's unceasing spirit of cooperation, nevertheless it did play a vital part in assisting the industrial arts profession to recognize the reality that a full spectrum vocational education delivery system includes industrial arts. Continued access to current information and such face-to-face interaction and in-depth probing is vitally necessary if Texas' industrial arts-vocational education profession is to maintain and increase the services rendered to its charges. The project's value will be best observed in the future activities of the Texas Education Agency and in the momentum of the profession as the challenges of inculcating the technological literacy of the new industrial arts curriculum through competency testing becomes a reality in Texas.

APPENDIX A

Solicitation Letter To TIAA Board Members

(Includes Nomination Forms)

September 20, 1981

The Texas Education Agency has funded a project proposed by Drs. Michael R. Kozak and David Devier of the Division of Industrial Arts at North Texas State University. This project is the "Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education of Texas."

A statewide Advisory Committee has been selected and is composed of: 1) Neil Ballard, Texas Education Agency, 2) M.D. Williamson, Chairman, Texas Council on Industrial Art Teacher Education, 3) Mike Pickett, President, Texas Council of Industrial Arts Supervisors, and 4) David Hill, President, Texas Industrial Arts Association. This Advisory Committee has nominated individuals from which a twelve-member state jury will be selected. These individuals are currently being contacted.

A workshop is to be held at North Texas State University on Friday, May 21, through Sunday, May 23, 1982. A copy of the "Workshop Schedule" is enclosed. The forty-three workshop participants will include: 1) five industrial arts supervisors, 2) a representative from the Texas Industrial Arts Association, 3) a representative from the Texas Council on Industrial Arts Teacher Education, 4) a representative from the Texas Education Agency, 5) twenty public school industrial arts instructors, and 6) a representative from each of the fifteen colleges/ universities in Texas that graduate industrial arts instructors.

The project staff is in the process of developing an initial catalog of professional and technical competencies which will be reviewed, edited and validated by the State Jury. The validated catalog will be utilized by the forty-three participants of the three-day workshop who will: 1) validate the findings of the State Jury, 2) determine the minimum acceptable professional and technical competencies (in all areas within each of the three technologies listed in the revised curriculum that was approved by the State Board of Education on March 14, 1981) for the graduates of an industrial arts teacher education program in Texas, and 3) define and recommend guidelines for the implementation of competency testing for industrial arts.

I am asking you as a member of the Texas Industrial Arts Association's Board of Directors to please nominate three

public school industrial arts teachers who would be willing to participate in the May, 1982 workshop - if selected. Since the recently approved Industrial Arts Curriculum for Texas is divided into three technologies, (Visual Communications, Energy/Power, Production), I am asking for a nominee in each of the three technologies. Please ask each of the individuals to complete the appropriate enclosed form and return it to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

The Advisory Committee will make its selection on October 31, 1981, and I will notify all individuals of the results. If you have any questions, please call me at (817) 788-2022.

Sincerely,

Michael R. Kozak
Project Director

Enclosures

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Visual Communications Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Energy/Power Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Production Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

APPENDIX B

Regional Association Presidents

(Includes Nomination Forms)

October 3, 1981

The Texas Education Agency has funded a project proposed by Drs. Michael R. Kozak and David Devier of the Division of Industrial Arts at North Texas State University. This project is the "Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education of Texas."

A statewide Advisory Committee has been selected and is composed of: 1) Neil Ballard, Texas Education Agency, 2) M.D. Williamson, Chairman, Texas Council on Industrial Arts Teacher Education 3) Mike Pickett, President, Texas Council of Industrial Arts Supervisors, and 4) David Hill, President, Texas Industrial Arts Association. This Advisory Committee has nominated individuals from which a twelve-member state jury will be selected. These individuals are currently being contacted.

A workshop is to be held at North Texas State University on Friday May 21, through Sunday, May 23, 1982. A copy of the "Workshop Schedule" is enclosed. The forty-three workshop participants will include: 1) five industrial arts supervisors, 2) a representative from the Texas Industrial Arts Association, 3) a representative from the Texas Council on Industrial Arts Teacher Education, 4) a representative from the Texas Education Agency, 5) twenty public school industrial arts instructors, and 6) a representative from each of the fifteen colleges/ universities in Texas that graduate industrial arts instructors.

The project staff is in the process of developing an initial catalog of professional and technical competencies which will be reviewed, edited and validated by the State Jury. The validated catalog will be utilized by the forty-three participants of the three-day workshop who will: 1) validate the findings of the State Jury, 2) determine the minimum acceptable professional and technical competencies (in all areas within each of the three technologies listed in the revised curriculum that was approved by the State Board of Education on March 14, 1981) for the graduates of an industrial arts teacher education program in Texas, and 3) define and recommend guidelines for the implementation of competency testing for industrial arts.

I am asking you as a President of a regional association to please nominate three individuals for the South Plains Regional

Association. Since the recently approved Industrial Arts Curriculum for Texas is divided into three technologies, (Visual Communications, Energy/Power, Production), I am asking for a nominee in each of the three technologies. Please ask each of the individuals to complete the appropriate enclosed form and return it to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

The Advisory Committee will make its selection on October 31, 1981, and I will notify all individuals of the results. If you have any questions, please call me at (817) 788-2022.

Sincerely,

Michael R. Kozak
Project Director

Enclosures

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Visual Communications Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Energy/Power Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Workshop Participant: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Regional Association: _____

If selected, I prefer to work with the group representing Production Technology.

Please return to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Please return by October 24, 1981.

APPENDIX C

Forms Completed By Recommended Workshop Participants

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Visual Communications Technology

Name: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

____ Yes, I will be able to participate in the workshop to be held at North Texas State University on May 21-23, 1982.

____ Sorry, I am unable to participate.

Please return before February 15, 1982 to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Energy/Power Technology

Name: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

___ Yes, I will be able to participate in the workshop to be held at North Texas State University on May 21-23, 1982.

___ Sorry, I am unable to participate.

Please return before February 15, 1982 to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Production Technology

Name: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

___ Yes, I will be able to participate in the workshop to be held at North Texas State University on May 21-23, 1982.

___ Sorry, I am unable to participate.

Please return before February 15, 1982 to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas

Name: _____

Institution: _____

Address: _____

_____

_____

Phone: _____

Please rank the following three technologies in order of your preference, (1,2,3). We will try to assign each participant his first choice, while maintaining an equal distribution of teacher educators in all three technologies.

Visual Communications Technology ____

Energy/Power Technology ____

Production Technology ____

Please return before January 30, 1982 to:

Dr. Michael Kozak, Project Director
Division of Industrial Arts
Box 13857
North Texas State University
Denton, Texas 76203

APPENDIX D

Letter to State Jury Members

April 6, 1982

Thank you for agreeing to serve on the State Jury for the Texas Education Agency funded project: "Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education In Texas." Enclosed are two sets of competencies: 1) Professional Competencies which are being mailed to all twelve members of the State Jury, and 2) Technical Competencies in your specialty area: Energy/Power Technology.

Before I indicate your specific tasks, I will review the progress of the project.

1. Mr. Glen D. Herrington is the Research Assistant and Ms. Melanie Gregg is the Project Secretary.
2. The Project Advisory Committee consists of:
   a. Neil Ballard (Texas Education Agency),
   b. Mike Pickett (Texas Council of Industrial Arts Supervisors),
   c. M.D. Williamson (Texas Council on Industrial Arts Teacher Education),
   d. David Hill (Texas Industrial Arts Association).
3. The State Jury consists of four teacher educators, three classroom teachers, two curriculum specialists, two industrial arts supervisors, and one State Department representative (See attachments).
4. A computer search, utilizing the facilities of North Texas State University, yielded 71 articles and documents which were reviewed along with approximately 200 textbooks, manuals and guides which were donated by various publishers.
5. The review process also included previous studies from colleges/universities and state departments from other states.
6. Definitions - as used in this study - of three important terms are:
   a. "Learning": a process - not a product - consisting of permanent behavioral changes which leads to the student becoming a free, responsible individual; occurs in practice of desired behaviors - learning while doing - and develops confidence in the student's ability to succeed.
   b. "Teaching": the facilitating of learning through motivation by presenting life situation problems within the environment of the classroom with which

students must cope; industrial arts teaching is the management, through instructional strategies, of an educational environment that is representative of the technological world.

c. "Competency": a skill, knowledge or attitude which implies the ability or intelligence to accomplish a task or job; represents the instructional intent and is stated as a specific goal to be achieved.

Competency statements are related to statements of goals and objectives. They are not broad statements of expected learning outcomes like goal statements, and they are not specific statements of expected learning outcomes like objective statements. Competency statements are mid-range statements that are placed on the continuum between goal and objective statements. Underlying the continuum of competency statements are assumptions which are value statements that set the parameters wherein the competencies can be specified. The "Rationale" of the Texas Industrial Arts Curriculum Committee and the Program Standards in the "Prepared Industrial Arts Curriculum Guide for Secondary Schools in Texas" are examples of such assumptions.

The list prepared for this research includes competency statements that range from very broad to quite narrow. The intent of the compilers was to avoid both the extremely narrow (objective) and the extremely broad (goal). It is understood that the list of competency statements would be operationalized by individual educational institutions in accordance with the respective personnel and facilities.

The competency statements as cataloged are intentionally without criterion specifications. The statements serve only as a description of the competencies which a beginning industrial arts teacher must exhibit. The context of the situation in which the teacher is expected to demonstrate the competency and the level of proficiency which is desirable are not included. Your assignment as a member of the State Jury is to: 1) review/edit the enclosed competencies; 2) add any competencies that you believe have been overlooked; and 3) evaluate the competencies as to whether they are appropriate or inappropriate to the topic areas within the technology. To simplify this task, please do the following:

1) Edit the individual competencies directly on the enclosed sheets.
2) Use the enclosed form - "Overlooked Competencies" - to add any competencies that you believe have been omitted.
3) Place an "I" in front of any competency that you believe to be "Inappropriate" for that particular topic area.

Please remember, that the workshop participants will be charged with the assignment to determine the <u>minimum</u> competencies for an industrial arts teacher education program. This is not <u>your</u> assignment.

If you have any questions, please call me at (817)788-2022. It is imperative that these completed documents be returned to me prior to May 1, 1982. We will need sufficient time to incorporate the responses from the members of the State Jury into the working document for the workshop participants. Thank you for giving of your valuable time to this project.

Sincerely,

Michael R. Kozak
Project Director

David Devier
Project Co-Director

cc: James Mahoney
Glen Herrington

APPENDIX E

Letter to Workshop Participants

April 14, 1982

Thank you for agreeing to assist in the Workshop for the TEA project, "Identification and Validation of Professional and Technical Competencies for Industrial Arts Teacher Education in Texas." We are delighted that you will be able to participate. Please plan to arrive Friday, May 21st so that you can register for your accommodations between 4:00-6:00p.m. and register for the workshop between 6:00-7:00p.m.

Enclosed is information about North Texas State University, Texas Woman's University, Denton, and Denton County. We have included some information regarding accommodations. Remember, you have $40.00 per day for expenses. If you plan to stay in a motel, please make your individual arrangements. If you plan to stay at TWU, Guinn Hall, contact us by April 30 in order that we can make arrangements for your room and parking permit.

We hope that you will enjoy your stay in Denton. If you have any questions, feel free to contact the project staff.

Sincerely,

Glen D. Herrington
Research Assistant

APPENDIX F

Workshop Schedule

Workshop Schedule

Friday, May 21, 1982

6:00-7:00 pm (Main Lobby, Industrial Arts Building)

Registration - Melanie Gregg and Debbie Jordan

7:00-7:30 pm (Room 231, Industrial Arts Building)

"Welcome to North Texas State University"
Dr. James Miller, Associate Dean, College of Education
Dr. John Richards, Division of Industrial Arts

7:30-9:00 pm (Room 231, Industrial Arts Building)

Distribution of Materials - Glen Herrington
Committee Assignments - David Devier
Explanation of Workshop Activities - Michael Kozak

Saturday, May 22, 1982

7:30-8:30 am (Room 231, Industrial Arts Building)

Review of Materials - Michael Kozak

8:30-11:00 am

Validation of State Jury Findings
Visual Communications Technology (Room 215) - David Devier
Energy/Power Technology (Room 214) - Michael Kozak
Production Technology (Room 231) - Glen Herrington

11:00-11:30 am (Room 231)

Review of Morning Activities - Committee Chairpersons

11:30 am-1:00 pm

Lunch

1:00-1:30 pm (Room 231)

Preparation for Afternoon Session - Michael Kozak

1:30-4:30 pm

Determination of Minimum Acceptable Competencies
Visual Communications Technology (Room 215) - David Devier
Energy/Power Technology (Room 214) - Michael Kozak
Production Technology (Room 231) - Glen Herrington

4:30-5:00 pm (Room 231)

Review of Afternoon Activities - Committee Chairpersons

5:00-6:30 pm

Dinner

6:30-9:00 pm (Room 231)

Determination of Minimum Acceptable Competencies
Visual Communications Technology (Room 215) - David Devier
Energy/Power Technology (Room 214) - Michael Kozak
Production Technology (Room 231) - Glen Herrington

9:00-9:30 pm (Room 231)

Review of Evening Activities - Committee Chairpersons

Sunday, May 23, 1982

7:30-8:00 am (Room 231)

Presentation of Completed Committee Assignments - Committee Chairpersons

8:00-9:30 am

Review of Completed Document and Final Revisions
Visual Communications Technology (Room 215) - David Devier
Energy/Power Technology (Room 214) - Michael Kozak
Production Technology (Room 231) - Glen Herrington

9:30-10:00 am (Room 231)

Review of Morning Activities - Committee Chairpersons

10:00-10:30 am (Room 231)

Presentation on Development of Implementation Guidelines - Neil Ballard

10:30-11:30 am

Develop Implementation Guidelines
Group I - Room 215 (Industrial Arts Supervisors) - David Devier
Group II - Room 214 (Industrial Arts Teacher Educators) - Michael Kozak
Group III - Room 231 (Public School Industrial Arts Instructors) - Glen Herrington

11:30 am-1:00 pm

Lunch

1:00-1:30 pm (Room 231)

Review of Morning Activities - Committee Chairpersons

1:30-2:30 pm (Room 231)

Synthesis of Implementation Guidelines and Final Revisions - Neil Ballard, Michael Kozak

2:30-3:00 pm (Room 231)

Workshop Evaluation - Michael Kozak

APPENDIX G

Workshop Evaluation Instrument

IDENTIFICATION AND VALIDATION OF PROFESSIONAL AND TECHNICAL COMPETENCIES FOR INDUSTRIAL ARTS TEACHER EDUCATION OF TEXAS
MAY 23, 1982
DENTON, TEXAS

PROJECT WORKSHOP EVALUATION INSTRUMENT (by participants)

Please provide your honest and direct input as to the strengths and weaknesses of the workshop. Your candor will facilitate our evaluation of the project.

Please respond to the following statements by circling the letters at the right that most nearly represents your opinion of the activities. Use the code: SD = Strongly Disagree; MD = Moderately Disagree; MA = Moderately Agree; SA = Strongly Agree; and NO = No Opinion.

1. The workshop was held at a centrally located, easily accessible site. SD MD MA SA NO

   COMMENTS: _____

2. The facilities were appropriate for the conference. SD MD MA SA NO

   COMMENTS: _____

3. The registration process was organized and presented little or no problems. SD MD MA SA NO

   COMMENTS: _____

4. The reception made you feel welcome. SD MD MA SA NO

   COMMENTS: _____

5. You were provided with sufficient materials to complete your workshop assignments. SD MD MA SA NO

   COMMENTS: _____

6. The time allotments were adequate. SD MD MA SA NO

   COMMENTS: _____

7. The project staff were cordial and helpful. SD MD MA SA NO

   COMMENTS: _____

8. This workshop was valuable to me. SD MD MA SA NO

   COMMENTS: _____

9. The results of the workshop will have a great impact in Texas on the industrial arts teaching profession in the years ahead. SD MD MA SA NO

   COMMENTS: _____

10. The needs of the participants were not considered. SD MD MA SA NO

    COMMENTS: _____

11. The assignments and materials to be covered were too difficult. SD MD MA SA NO

    COMMENTS: _____

12. Insert the appropriate rating for each member of the project staff (and TEA representative) on each of the following criterion. Use the same code: SD = Strongly Disagree; MD = etc.

	Michael Kozak, Project Director	David Devier, Project Co-Director	Neil Ballard, TEA Representative	Glen Herrington, Research Assistant	Melanie Gregg, Project Secretary	Debbie Jordan, Project Secretary
A. Developed a comfortable working climate.						
B. Was interested in one's problems and questions.						
C. Was well informed.						
D. Was a great help in my accomplishing the project assignments.						
E. Presented useful information.						

13. What did you like best about the workshop? _____

_____

_____

_____

14. What did you like least about the workshop? _____

_____

_____

_____

Thank you for your careful responses and for your dedication to the profession. It has been a pleasure.

Michael R. Kozak David Devier Glen Herrington

APPENDIX H

Detailed Summary of Participant Evaluation of the Workshop

DETAILED SUMMARY

PARTICIPANT EVALUATION OF THE WORKSHOP

SECTION 1.

		SD	MD	MA	SA	NO
1.	The workshop was held at a centrally located, easily accessible site.	1	2	13	9	1
2.	The facilities were appropriate for the conference.			4	22	
3.	The registration process was organized and presented little or no problems.				26	
4.	The reception made you feel welcome.			3	22	1
5.	You were provided with sufficient materials to complete your workshop assignments.			3	23	
6.	The time allotments were adequate.	2	7	11	6	
7.	The project staff were cordial and helpful.			1	25	
8.	This workshop was valuable to me.			4	22	
9.	The results of the workshop will have a great impact in Texas on the industrial arts teaching profession in the years ahead.		1	4	21	
10.	The needs of the participants were not considered.	17	5	2	2	
11.	The assignments and materials to be covered were too difficult.	14	7	5		

Comments

1. A long way for participants from the south, west and southwest.

1. For me it was good. Some had three times as far to come.
1. Denton is not the center of the state.
1. Easily accesible yes; not central.

2. Meeting rooms were too warm.
2. Very good; little warm.

3. Map not clear for location.

4. Definitely.

6. Just about right.
6. Overall time was crowding; for individual it wasn't too bad.
6. Not quite enough time.
6. You lose effectiveness of people with too long of a meeting.
6. A little too short of time for such an important and long life document.
6. Half day more to finalize technical competencies in outline form.
6. I feel a full week should have been used.
6. First draft material should be sent early by mail; a lot of work for a little over two days.
6. Most were okay; one was rushed.

8. Gave me an opportunity to evaluate myself.
8. I really enjoyed working with other professionals on such a big task.
8. I found it extremely interesting and stimulating.

8. The best I have ever attended.

9. Even the nation.

9. I hope so, after all this work.

9. If adopted.

Section 2.

	SD	MD	MA	SA	NO
1. Project Director Michael Kozak					
A. Developed a comfortable working climate.			3	22	1
B. Was interested in one's problems and questions.			4	19	3
C. Was well informed.			4	21	1
D. Was a great help in my accomplishing the workshop.			2	22	2
E. Presented useful information.			3	21	2

2. Project Co-Director David Devier	SD	MD	MA	SA	NO
A. Developed a comfortable working climate.			3	20	3
B. Was interested in one's problems and questions.			3	19	4
C. Was well informed.			2	22	2
D. Was a great help in my accomplishing the project assignments.			4	19	3
E. Presented useful information.			2	13	11

3. TEA Representative Neil Ballard	SD	MD	MA	SA	NO
A. Developed a comfortable working climate.	1		6	16	3
B. Was interested in one's problems and questions.			6	15	5
C. Was well informed.		2	3	17	4
D. Was a great help in my accomplishing the project assignments.			10	12	4
E. Presented useful information.		1	7	16	2

4. Research Assistant Glen Herrington	SD	MD	MA	SA	NO
A. Developed a comfortable working climate.		1	3	20	2
B. Was interested in one's problems and questions.		1	3	18	4
C. Was well informed.			2	21	3
D. Was a great help in my accomplishing the project assignments.	1		2	20	3
E. Presented useful information.			4	20	2

5. Project Secretary Melanie Gregg	SD	MD	MA	SA	NO
A. Developed a comfortable working climate.			2	18	6
B. Was interested in one's problems and questions.			2	17	7
C. Was well informed.			1	15	10
D. Was a great help in my accomplishing the project assignments.			3	18	5
E. Presented useful information.			2	13	11

6. Project Secretary Debbie Jordan	SD	MD	MA	SA	NO
A. Developed a comfortable working climate.			2	18	6
B. Was interested in one's problems and questions.			2	17	7
C. Was well informed.			1	15	10
D. Was a great help in my accomplishing the project assignments.			3	18	5
E. Presented useful information.			2	13	11

Section 3.

I. What did you like best about the workshop?

1. Short period of time.
2. The determination of minimum competencies for industrial arts teachers.
3. I liked the workshop's invaluable information that I received on the pending Industrial Arts teacher's testing on Competencies; I liked the way I was received (welcomed) and the opportunity that I had to meet my fellow Industrial Arts teachers from other parts of Texas.
4. The entire workshop was great.
5. Meeting and working with area teachers.
6. Group interaction.
7. Be a part of a workshop that will have state impact; meet other professionals.
8. Value of content to my profession in future.
9. The professional attitudes.
10. Period of time.

11. Opportunity for all to have input; director receptive to all input; gave participants opportunity to resolve differences.
12. The project leadership was great and the opportunity to be a part of selecting Industrial Arts professional competencies.
13. Generally good interaction among participants; your flexibility in allowing additional discussion of the professional competencies helped a lot.
14. Hearing different concepts and viewpoints concerning industrial arts and specific course content.
15. I felt I got to give my input on several items and although I do not have the experience as the majority did, I was still heard; I feel I grew professionally this weekend.
16. Good mix of professional people.
17. Working with a broad spectrum of my peers.
18. The workshop was organized; the objectives laid on the line and the business at hand was taken care of in a professional manner.
19. It was a real educational experience; I have grown professionally by being in attendance.
20. I was very impressed with the overall quality of the men and women chosen to participate in the workshop and the ratio of participants from differenct job titles was excellent.
21. Being able to share feelings with other professionals.
22. Structure; format; informal atmosphere; selection of

participants.

23. Well organized; well run; good companionship; stimulating discussion.

24. Group work; Kozak's flexibility.

25. I don't think it is something you like or dislike - it is something that had to be done.

II. What did you like least about the workshop?

1. Depth and complexity of problem to be resolved.

2. It would have been very helpful to have had the preliminary competency lists ahead of workshop.

3. Limited time; expand to additional days; no "Fellowship"; Disruption of worship time on Sunday.

4. The timing of the workshop - it was difficult for us during these last two weeks of school to get away; also missing church services Sunday morning.

5. Date - teachers very busy finishing semester work.

6. The lack of time to discuss the materials.

7. Lack of a group socially-oriented activity.

8. Met after meeting and made corrections - keep in mind for future workshops.

9. I believe some of the information was covered much too fast and didn't get the attention it needed.

10. Some material may have been covered too rapidly to give proper consideration.

11. With the state being in very short supply of Industrial Arts teachers, I hope that the objectives of these competencies do not discourage students from entering

or completing industrial arts degrees.

12. The time that it was held - one week later would have been much more convenient - especially for public school teachers; we are in the hectic part of the year - the shut-down.
13. With the extreme importance and urgency of the project in mind, I feel time was too short to give justice to the document.
14. Having such a short time; missing church on Sunday.
15. Night and Sunday work periods.
16. Believe per diem could have been paid at close of conference rather than waiting 10-14 days - put a strain on the personal budget that could have been alleviated by extra work of finance department.
17. 7:00 a.m. start time; working Sunday morning without going to church.
18. I don't think it is something you like or dislike - it is something that had to be done.